

FINAL REPORT
OF THE
WORKING GROUP ON PROGRAM EVALUATION



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to the
Sub-Committee on Quality of Care and Research
and the
Advisory Committee on Health Insurance

VOLUME I
RECOMMENDATIONS, PROCEEDINGS AND STUDIES



Health Programs Branch
Department of National Health and Welfare
Ottawa, Canada
1977

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ACKNOWLEDGEMENTS

The Working Group is indebted to the many persons and organizations who contributed to its work for their cooperation and assistance. While they are too numerous to acknowledge individually, special thanks are due to:

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and the many persons whom the visiting team met in the provinces (listed in Appendix I).

I INTRODUCTION

As the health sector has passed from its brief tenure as first claimant on public funds to a position of having to compete with alternative uses of resources, the requirement that health administrators justify their requests for new programs and defend their present activities has grown. This in turn has led to demands for consistent, comparable and comprehensive defenses and justifications; the name given to this task has been "program evaluation". Increasingly health administrators are directed to evaluate their on-going programs or to commit themselves to an evaluation of new undertakings. Program managers, however, are not without misgivings about undertaking evaluation of their programs and they are frequently in doubt about how to undertake their evaluation.

The Sub-Committee on Quality of Care and Research has found itself in this position. Faced in 1973 with questions about the value of cytology screening programs, it commissioned a review of the state of the art of health program evaluation. A discussion paper* was favourably received by the Sub-Committee. It recommended that a Working Party on Program Evaluation be established to develop a document on the present state of the art of health program evaluation and to recommend future courses of action. (See Appendix II for the Working Party's Terms of Reference.)

This volume is the report of the Working Party. It begins with an explanation of how the Working Party proceeded with its task. It then summarizes the findings and recommendations of the Working Party, and concludes with several topical examples of deficiencies in the current practice of program evaluation. A comprehensive bibliography is presented as Appendix III.

*The Evaluation of Health Programs with Particular Reference to Screening Programs, David L. Martin, Health Insurance Directorate, Health Programs Branch, Department of National Health and Welfare, Ottawa, September 1973.

The second volume of the report is a Primer on Health Program Evaluation. It provides a detailed methodology for the execution of program evaluation with relevant references cited.

The Working Party has generally recommended that the resources devoted to program evaluation be significantly increased. At the same time, however, it has recognized that there are many structural features and incentive patterns in health care delivery which discourage evaluation. Although such evaluation is a currently fashionable topic of interest, the minimal development of genuine evaluative efforts found by the Working Party may reflect an absence of demand for such services by program administrators and managers. Like the weather, everyone talks about evaluation but nobody does anything about it. The Working Party were aware that there may be good reasons not to evaluate.

If the current lack of evaluative effort is in fact due to absence of demand rather than unavailability of capable personnel and resources, a policy of expanding such resources would be futile. The Working Party has taken the view, however, that a genuine demand does exist for greater accountability, cost-effectiveness, and cost control in health care, if not by health care administrators then by their political masters. Underlying all its work has been the presumption that such improved efficiency can come about only through improved program evaluation, particularly of existing programs. Even if one adopts a more pessimistic or "red-necked" view that rational analysis or control of health care delivery is impossible and that the only feasible strategy is one of pegging total health expenditures to a fixed percentage of G.N.P., come what may, the problem of allocation of total health resources so determined would still remain. Moreover, the percentage of G.N.P. used as a peg, while in the short run perhaps based on last year's experience, must over longer periods be adjusted according to some evaluative criteria. One cannot avoid evaluation. One can, however, choose whether or not to do it explicitly, rationally, and openly, or by random guesses. Rightly or wrongly, the Working Party puts greater trust in the former process.

II THE PROCEEDINGS AND STUDIES OF THE WORKING GROUP

Between June 1974, and June 1976, the Working Group met five times, with additional meetings held between those members of the Working Group responsible for individual sections of the final report. The other activities of the Working Group, including those carried out for it, are outlined briefly below:

1. The production of an up-dated bibliography on program evaluation (Appendix III).
2. A survey to determine from the provincial authorities their on-going and recently completed program evaluation projects.
3. A review of National Health Grant financed evaluation projects (identified by specific key words in the NHG project listings).
4. Presentations received by the Working Group from persons involved in or vitally interested in health program evaluation activities.
5. A review by the Working Group members of the Health Care Evaluation seminar manual.
6. Site visits to three provinces in order to elaborate on the survey noted above.
7. The preparation of position papers related to sections of this final report.
8. The preparation of "A Primer on Health Program Evaluation", a manual to accompany this report.

Early in its deliberations, the Working Party decided to ascertain the "state of the art" of program evaluation in the Canadian health care system. This background information was required to help identify problems, and to provide a context for our recommendations. The first approach to developing this review was a survey of all Provincial Ministries of Health.

The information provided by the responding Ministries was disappointing. While the mailed survey elicited evidence of interesting projects, in the opinion of the Working Group it neither mirrored the "state of the art" nor adequately indicated whether program evaluation activities met Ministry needs. The Working Party decided to augment the information gathered by this survey by site visits to three provinces.

A visiting team was formed consisting of members who had first-hand experience with evaluation activity in two of the provincial ministries of health and in the Department of National Health and Welfare. This team spent two days in each of three additional provincial ministries interviewing senior civil servants. The interviewers used a semi-structured approach to allow the participants to express their views on program evaluation in their own terms. The participants were so candid and comprehensive that the interviewers rarely used an agenda to stimulate discussion or to orient the interviews.

After an initial synthesis of its findings, the visiting team checked them with three additional provinces for consistency.

The findings could not be presented as the results of a rigorous study. Nevertheless, the visiting team felt that in aggregate they represented the major problems and issues in health care program evaluation in Canada today.

The Working Group also discussed, during its deliberations, the role of the Program Evaluation Division within the Program Development and Evaluation Directorate and the concerns of the Canadian Hospital Association.

In summary, the results of the Working Group's review of the Discussion Paper appear as Volume II of this report: "Health Program Evaluation - A Primer". The examples of its application appear as section VI of this report volume. Its summary statements and recommendations as to how health program evaluation can be improved follow immediately.

III CONCLUSIONS OF THE WORKING GROUP ON PROGRAM EVALUATION

1. There is a need for universally recognized definitions of the terms "program" and "program evaluation".
2. The definition of "program evaluation" should reflect its role as an essential component of the management process.
3. The development of new health care technology and knowledge, coupled with an economic climate of restraint, has created the demand for and current popularity of program evaluation. However, due to an insufficient number of trained people, diffusion of the program evaluation methodology has not kept pace with the needs.
4. The current efforts in program evaluation are very limited:
 - 4.1 Frequently, no program evaluation is performed. Evaluated programs represent only a limited proportion of governmental budgets.
 - 4.2 Informal or imprecise enquiries are common. Frequently enquiries are limited to restricted aspects of the program.
 - 4.3 Insufficient funds and personnel have been allocated to program evaluation efforts.
 - 4.4 Program evaluation is often not built into the planning systems. In some instances, the Programming, Planning and Budgeting System procedures (PPBS) are superimposed on already-operative systems, rather than replacing them. Therefore, program evaluation becomes resented as a further imposition on management's restricted time.
 - 4.5 Cross-program evaluation appears to be virtually non-existent.

5. There are powerful disincentives to doing program evaluation, including:
 - 5.1 the tendency in bureaucracies to reward program managers in proportion to the size of their expenditures.
 - 5.2 the deep personal involvement and investment by program managers in the future of their programs.
 - 5.3 a general resistance to change and, therefore, resistance to evaluation.
6. There is an unequal (and perhaps unfair) scrutiny of new programs. While new programs may be easier to stop, existing programs have a much greater impact on total government spending.
7. Present evaluation efforts appear to be unsophisticated.
 - 7.1 There is little information dissemination between program evaluators.
 - 7.2 Much redundant development of techniques and, conversely, little exploration of new conceptual areas takes place.
 - 7.3 There is generally little understanding of the relative costs and benefits of information for decision-making.
8. Techniques of measuring costs, outputs and outcomes are relatively undeveloped.
9. The allocation of resources for the acquisition, processing and dissemination of data describing the performance of health care programs needs re-thinking.
 - 9.1 Substantial amounts are spent on large computer and non-computer based information systems. Unfortunately these systems tend to be oriented primarily to business operations such as claims processing.

- 9.2 These business systems consume an inordinate share of the resources allocated for data processing, leaving few resources for information systems oriented solely to evaluation.
 - 9.3 Much of the data produced by these business systems could be of value, but there is a reluctance to devote resources to transform this data into useful information.
 - 9.4 There is an even stronger resistance to add data items to these business systems which evaluators would find useful but are of no value to the business operations.
 - 9.5 There is little sharing of information and information systems between provinces. This makes comparison of programs difficult. It is also wasteful.
- 10. There are insufficient numbers of persons trained in health program evaluation techniques to act in a staff capacity to health program managers. Few program managers are sufficiently conversant with program evaluation roles and techniques to understand the contribution that program evaluation can make to their program management decisions.
 - 11. A key consideration in the present inability of program evaluators to fulfill the needs of program management lies in the lack of a coordinated and cohesive association of persons knowledgeable and concerned about program evaluation. As a result:
 - 11.1 There are few effective mechanisms for the sharing of technology and results among program evaluation experts or for the dissemination of information on program evaluation resources.
 - 11.2 Centres of consultative expertise have not developed to the point where they could achieve their maximum potential contribution.
 - 11.3 Effective mechanisms to determine program evaluators' data base needs particularly for interprogram comparability are lacking.

IV IT IS THEREFORE RECOMMENDED THAT:

1. The following definitions be referred to the Canadian Hospital Association and other appropriate organizations for incorporation into their proceedings or publications, particularly their terminology manuals:
 - 1.1 The term "program" be recognized as a grouping of resources (including persons, funds, equipment and supplies) performing activities, all of which fall within definable boundaries enabling the scope of the program and its activities to be measured, and achieving outputs (or ultimately outcomes) aimed at fulfilling a definable set of objectives.
 - 1.2 "Program evaluation" be similarly defined as the measurement of the program's outputs or results and their comparison to standards or to the resources made available to the program, for the purpose of defining policy, resources or objectives changes and, hence, altering the management of the program.
2. Governmental and other agencies which are seriously concerned with improving the efficiency and effectiveness of health care delivery would be well advised to upgrade program evaluation resources generally, to bring the methodology knowledge and resources in the field into alignment with current demands for program evaluation.
3. Each program be required to include evaluation activities as a specific budget item, and program managers be held accountable for the agreed-upon performance of program evaluation activities. In the aggregate one-half of one per cent of the total health care budget should be set aside for program evaluation purposes. The proportion appropriate to each program, however, will possibly be greater for smaller or newer programs, depending upon the potential objectives of the specific evaluation. Furthermore, when budgeting tradeoffs become necessary between service delivery and evaluation of those delivery programs, the tradeoffs should not be resolved in favour of service delivery.

4. At least equal priority be given evaluation activities for existing programs as is required for proposed or new programs.
5. Governmental and other authorities continue to encourage educational programs in program evaluation, including:
 - a. relevant educational programs at the university post-graduate level to prepare program evaluation experts, with appropriate financial support (in part through the National Health Scholarship Program)
 - b. health care evaluation seminars for program managers to increase awareness of the potential uses and requirements for program evaluation;
 - c. mechanisms for interchanges between academic, government and institutional environments early in the careers of those involved. Specifically, National Health Student Fellowships and Career Development Awards should be tenable at non-academic institutions.
6. Existing data systems be examined closely with a view to meeting the needs of program evaluators; specifically, since a very large volume of resources, probably of the order of \$100 million in the case of fee-for-service medical insurance plans, is currently being spent on administering existing plans, priority should be given to redirecting a significant proportion of these resources to the development of new management information systems which will permit evaluation of existing programs.
7. Program evaluation data requirements be specifically provided for in the plans for new programs.
8. Program evaluators be included in those committees or commissions where alterations to data bases are being contemplated.

9. The Federal Government establish:

a clearing house or information centre to receive and appropriately distribute information on:

- program evaluation activities, particularly completed studies;
- new or revised methods, new applications, data, etc.;
- available evaluation consultants and their particular skills or expertise;
- research activities funded from federal, provincial or other sources;

10. The Federal Government make available to provincial governments \$10 million (1977 dollars) to finance regional centres of program evaluation consultative expertise.

V DISCUSSION

1. There is a Need for a Universally Recognized Definition of the Term "Program".

This problem arose early in the Working Group's discussions and, in fact, was also faced by the SubCommittee on Quality of Care and Research. The definition had to be sufficiently general to encompass an already-wide diversity of program types. It also had to be specific enough so that the boundaries of the program could be defined and measured.

It is important that the boundaries be definable and, as will be outlined later in this report, extremely important that the objectives of the program be explicitly defined in observable and measurable terms. The many possible boundary definitions for resources, activities, consumers or results are outlined in Volume II of this report ("Health Program Evaluation - A Primer").

2. There is a Need for a Universally Recognized Understanding of the Term "Program Evaluation".

There is no universally recognized definition of program evaluation, recognizing that it can be either formal or informal in nature.

The Working Group was aware that its definition would not include the evaluation of the objectives themselves. In most cases, a program constitutes part of a larger program or administration, which in turn sets the objectives not only for the program under consideration, but for other programs as well. For example, if an agency encompassed three programs it would establish the objectives and resource allocations for these programs. This constitutes, in effect, the "output" of that agency. Thus, the sum total impact of the agency's programs would be evaluated as its total "program".

The Working Group observed that studies which are not specifically oriented to contributing to better management decisions should be excluded from the scope of the Working Group's concern. On the other hand, feasibility studies which simulate potential programs, pilot studies, and similar ventures fall within the terms of this definition.

The Working Group concluded that evaluation should be recognized as an integral part of management activities. While program evaluation might be envisaged as occurring during or following the completion of a program, planning for evaluation must be undertaken at the program's inception. The program plan developed by management must include evaluation, and evaluation in turn will contribute to the managers' knowledge for program planning purposes.

All program managers must recognize that they are program evaluators. However, when the conceptual or technical problems of program evaluation become complex (as are the examples given in this volume and in Volume II), the program manager should feel free to call upon persons specifically trained to handle these complexities.

3. The Development and Diffusion of Technology, Knowledge and Resources have not kept pace with the Demand Created by the Needs and Current Popularity of Program Evaluation.

Many factors have contributed to the current "vogue" for program evaluation, including but not limited to:

- (a) the development of new administrative techniques, such as the programming, planning and budgeting system (P.P.B.S.);
- (b) the current concern about financial restraints, and the need to know the value received for every dollar spent in health programs;

- (c) the development of new and more sophisticated health programs aimed at solving complex problems, with the result that definitions of resources required and results achieved become unclear; and
- (d) the increasing complexity of the health field generally, entailing the advent of new professions and techniques and resulting in greater dispersal or differentiation of the health care dollar.

Virtually all government agencies and research funding sources now require that formal evaluation be built into new proposals. This has built new demands into the health care field for which it has not been prepared. Not only are there too few persons trained to undertake complex program evaluations, but program managers also do not understand the need for and contribution of program evaluation. Program evaluation is frequently included in new proposals only to satisfy the demands of financial authorities.

Frequently, the few available program evaluation experts also face data insufficient to their needs and technical problems for which approaches may have already been developed. Knowledge of these approaches may not be available as they are simply not publicized. What is generally required, therefore, is a commitment on the part of government authorities and other health agencies to overcome them through effective communication channels.

4. The Amount of Formal Program Evaluation is Very Limited.

This statement involves a number of dimensions. First, looking at the number of persons on a full-time equivalent basis devoted to program evaluation efforts, the Working Group felt that 200 persons is a generous estimate for all of Canada: one quarter with the federal and provincial governments, one quarter in academic institutions, and about one

half in hospitals, other health research and delivery organizations, and hospital and health associations. This estimate would reflect a cost of, at most, \$10 million in direct and indirect costs.

The total annual cost of health delivery is \$11 billion. A common recommendation is that one half of one percent of program costs should be devoted to evaluation efforts. Therefore, \$55 million, rather than the present \$10 million, would be a more appropriate investment. In order to catch up to this criterion in 10 years, with present inflation rates, an annual rate of growth of 20% in program evaluation budgets would be required.

As a further indication of the limited scope of formal program evaluation, a survey was undertaken of the federal government, which included five departments, National Health and Welfare, Manpower and Immigration, Secretary of State, Indian and Northern Affairs, and the Department of the Solicitor General.* Within these departments, only 38 studies were identified as having been completed, three of which were in National Health and Welfare. The value of the programs concerned, however, was only \$156 million, compared to a total value of almost \$10 billion for the federal social welfare programs carried out by these five departments.

In its review of National Health Grant supported projects, the Working Group found very few exemplary projects in terms of general applicability or methodology. Evaluation criteria often were not stated, and relatively few projects could be generalized beyond the target group or sample population, the special health field involved, or the political boundaries described within the project. Most dealt with the effects of instruments or interventions, and few dealt with the benefits involved. Very few dealt with the effects of such interventions on the health system.

*Federal Level Evaluation, Leonard Rutman and Dick de Jong, Carleton University Graphic Services, Ottawa, 1976.

The Working Group concluded that priority should be given to projects where the field can be generalized and where effects on the health system are taken into account. Evaluators should be required to state their objectives, the expected outcomes and the scope or limitations of their projects.

It is recognized, of course, that informal evaluation takes place. Frequently, these informal evaluations are undertaken because of the personal interest of a particular program manager. In many cases, they appear to be biased and self-serving because the program manager has a job and an organization to protect. It is also noted that much of those funds that might be devoted to program evaluation from a long range perspective are devoted instead to short range "policing" evaluations, particularly in claims processing.

A further measure of this impression was noted in the study referred to earlier. Their test for effectiveness of evaluative studies assumed three pre-conditions:

1. A clearly articulated program;
2. A clearly specified goal(s) and/or effect(s);
3. A rationale that linked the program to the goals and/or effects.

None of 22 evaluations analysed in the above-noted study met all of these conditions. In many cases the evaluators focused on effects that the programs werenot designed to accomplish (i.e. many government programs are started without adequate consideration of the objectives of the program).

In a number of instances, both provincial and federal, the introduction of the P.P.B.S. system or similar systems has resulted in some program evaluation activity. However, as they are presently conceived, these systems appear to be counter-productive. Many managers view the systems as more

bureaucratic paperwork to be circumvented, accommodated or subverted. Rather than supplanting or replacing existing planning and operating systems, the systems have been superimposed and have not been accepted as a new *modus operandi* for health care program and planning decisions at the operating levels.

The visiting team did find a substantial interest by program managers in rationalizing the system and evaluating their programs. Certainly, frustration with existing planning and decision processes was universal.

This frustration was evident at all levels, politician, senior civil servant and program manager. This dissatisfaction with the present system and interest in evaluation can be turned to the advantage of the health care system, assuming the stated interest is not lip-service. In the opinion of those visiting the provinces, the interest was genuine.

Within the Department of National Health and Welfare itself, all branches have one or more evaluation units, but only one welfare program has been evaluated. Three evaluation studies have been completed in health (none by an evaluation group). Only one study, an evaluation of the Health Resources Fund, is currently underway.

This should not be taken to mean that evaluation is absent from the federal public service. An operational performance measurement system is being introduced, but at the present time it is primarily concerned only with operational efficiency. Higher proxy level analyses (such as operational effectiveness, program effectiveness or contribution to well-being) are not being undertaken. On the other hand, total reviews of government programs are being undertaken, with a review of welfare legislation completed recently ("The Orange Paper") and health care legislation (particularly insurance programs) currently under review. To some extent, however, these cannot be termed formal program evaluation routines.

5. There are Powerful Disincentives to doing Program Evaluation

The traditional incentive for the program manager is bigness, defined by expenditure levels, the number of people employed, particularly professionals, etc. The general rule is: the larger the organization, the more resources consumed, the greater the prestige and income for the manager.

In many of the jurisdictions the visiting teams examined, bigness appeared to be the most important measure of worth. There were few analogues to the "profit line" of private industry operating in the Canadian health care system. Consequently, most evaluation activity is oriented to providing information to the program manager to allow him or her to demonstrate that the program is working well with existing expenditures and could do better with additional expenditures.

A hospital administrator described the division of budgets as the distribution of rewards. Department managers typically look for increases in department budgets. They regard decreases or even "holding the line" as a punishment. Rarely would a department head look upon a reduction in his departmental budget as a demonstration of and reward for good efforts.

In addition, program managers have a personal investment and interest in the future of their programs. The visiting team frequently observed that program managers appeared to be zealots for their own programs. Few evaluated their programs with test hypotheses that questioned the basic worth of their programs, or looked for substitutes that would replace them.

Finally, the implementation of program evaluation concepts faces strong resistance to change. The most secure civil servant will view with some trepidation an inquiry into the operations of his department or program, which may bring about

significant changes or even the discontinuance of his program. Even when he himself is clearly convinced of the need for his program, the arrival of the evaluator is never greeted with eager anticipation.

6. There is an Unequal and Perhaps Unfair Scrutiny of New Programs.

A number of provinces have introduced Program Planning and Budgeting Systems on a phased basis. Usually only new programs are required to conform to the additional scrutiny demanded by these systems, while existing programs continue to be funded and managed in the traditional way.

In those provinces that have not embarked on P.P.B.S., most have two budgets, usually called Budget A and Budget B. The federal government, with P.P.B.S., also has "A" and "B" budgets. The new programs (Budget B) must be scrutinized and justified far more extensively than the ongoing programs of Budget A.

Improved evaluation must start somewhere. New programs, before they are operational, are much easier to stop politically than existing programs, but they usually represent a very small proportion of the budget. In the opinion of the Working Group, the primary consideration in selecting programs for a phased-in program evaluation process should be the size of budget. Other considerations include efficacy, impact and cost-effectiveness.

7. The Present Evaluation Efforts appear to be Unsophisticated

It is recognized that increased sophistication is only relevant if the additional information gained is worth the price. However, frequently the costs of the additional sophistication are unknown, and the data it requires renders it virtually impossible.

The visiting teams found few examples of inter-provincial trading of information systems, data or program evaluation results. There is much "reinventing of the wheel". In each provincial

health department, program evaluation routines were being designed, many of which have been devised, tried, and frequently found wanting elsewhere.

There appeared to be little exploration of new conceptual areas for program evaluation. The majority of efforts appeared to be devoted to under-developed cost-benefit studies and data collection exercises, where it was assumed that the data would somehow yield the required answers. While a few program managers belied the above observations, they were exceptions to the rule.

Finally, existing management systems appear to be deficient in that they do not deal with cross-program evaluation. Those visiting the provinces saw no evidence of decision making that dealt with trade-offs in budget allocation between two or more programs.

There appears to be little understanding of the relative costs and benefits of information for decision-making. As a result, many decisions tend to be made intuitively, frequently with poor results. These observations are more fully discussed in Section 8 below, and in Appendix C of Volume 2 of this report.

8. A Major Obstacle to Health Program Evaluation is the Relatively Undeveloped Nature of the Techniques of Measuring Inputs, Outputs, and Outcomes.

When the Working Group members surveying the provinces inquired about measures of health care effectiveness, they were frequently confronted with the old saying: "After all, how can you really measure the value of a life saved."

While this problem is obviously difficult, program evaluation can proceed. A single measure that linked or allowed comparative evaluation of output would be invaluable. However, it is not a pre-requisite to program evaluation activity. If we begin with the specification of program objectives, the measurement of the attainment of these objectives, including accurate measurement of all

costs incurred, the learning experiences would undoubtedly lead to improvements and refinements.

As noted above, the visiting members of the Working Group found a paucity of effort devoted to developing new measures of program performance. It was felt that the major reason for this was not the difficulty, but the lack of management systems that encouraged their development and use.

In those evaluation activities that were undertaken, strategic and technical errors were made which led to invalid conclusions. The profound impact of these errors has led this Working Group to devote a special section of this report to examples of them. (See Section VI).

9. The Allocation of Resources for the Acquisition, Processing and Dissemination of Data Describing the Performance of Health Care Programs Needs Re-thinking.

The first problem relates to data availability. A common complaint of the program managers interviewed was the amount of potentially valuable data which has not been adequately synthesized to meet their needs. Substantial efforts would be required to process the data.

Second, provincial and federal health program managers stated that the existing information systems rarely met their requirements. The systems, while processing large amounts of data, could only respond very slowly when required to process existing data in new ways to answer new questions. Therefore, the data available would frequently be inappropriate, invalid, unreliable, untimely and inconsistent.

Data collection authorities are even less enthusiastic about collecting new data that do not readily fit into or serve their existing systems. Rather than attempting to devise new data sources and collection routines, incremental changes will only be made, if possible, to existing statistical surveys, (e.g., the Annual Returns for Hospitals, HS-1 and HS-2).

10. There are Insufficient Numbers of Persons Trained
in Program Evaluation Methods to Support the
Existing Managers.

This conclusion has been reached by many in the health care system:

- 1) It was stated many times to the visiting team.
- 2) It has been stated by representatives from existing evaluation groups who have been called upon to assist numerous health departments and health agencies to evaluate their own programs.
- 3) The relatively few studies undertaken in this field (reflected in Section 4 above) and the crucial errors that are being made (as reflected in Section VI) point to a crucial need for effective analytical assistance to program managers to aid them in making key decisions.

It has not been possible to develop anything more than an estimate of the resources available or to give any idea as to what the potential need would be.

Sources of consultative expertise, particularly health administration programs, are being hard pressed to provide consultative or even personnel assistance in evaluation of various government or health institution programs. Demand for this service outstrips the supply in terms of available faculty hours. There is also no suitable or appropriate financial base to support such activities. Resources would have to be pulled away from teaching other research programs.

Efforts to improve the program managers' knowledge of quantitative methods and program evaluation techniques are badly needed. There are numerous ways of doing this, including establishing exchange programs between health agencies and university health administration programs; establishing management information seminars on program evaluation

or incorporating program evaluation into existing seminars, conferences and conventions for health care managers; and encouraging the development of papers in general health administration literature on the uses and effects of program evaluation techniques. When program managers enhance their understanding of how program evaluators can assist them, the Working Group feels that the need for program evaluators will increase, and at the same time become more readily defined.

One step in the education of program administrators is the development of a "primer" in health program evaluation. The Working Group has complied with the request by the Sub-Committee on Quality of Care and Research and presented it as Volume II of this report. This volume has attempted to define in relatively simple terms the role of and steps involved in health program evaluation. For those interested in studying this field, it has also provided an introduction to other literature on the subject and a bibliography.

11. There is a Lack of a Coordinated and Cohesive Association of Persons Knowledgeable and Concerned About Health Program Evaluation.

It appeared obvious to the Working Group that program evaluators operate in isolation. There are no ready channels for the dissemination of information on program evaluations undertaken, their techniques or results, new data bases established, or even the whereabouts of the persons working in the field. As a result, there is much wasted effort.

An example of the waste is the former dissemination policy of the National Health Research and Development Grants (formerly Directorate of National Health Grants). Until recently, no public distribution was attempted, not even the publishing of abstracts. The reports submitted to that Directorate were simply filed. It was virtually impossible for anyone outside of the research project group to learn of the techniques or findings. The Working Group understands that this situation will change, that previous projects will be made available through the Departmental Library, and that future project reports will be reproduced, where appropriate, by the Directorate.

A clearing house for information on evaluation and evaluators, encompassing proposed projects, newly developed technical approaches, current evaluation research findings, the education and locations of evaluation experts, and newly published materials in the field would solve many of these problems. It could be based within the Department of National Health and Welfare and would help draw together professional health care evaluators at a reasonable cost.

A periodic forum of program evaluators would be beneficial. New program evaluation technical approaches could be presented, questioned or defended in front of a critical audience. The forum would permit program evaluators to define areas where new techniques and data bases are required. It could also help avoid duplication in technique development, and assist in the definition of appropriate data bases (thus supplementing the efforts of the Interdepartmental Committee on Health Statistics). This could be supplemented by regional forums if appropriate.

The forum would also prove a useful supplement to the existing Health Care Evaluation Seminars referred to previously. The two would fulfill complementary but distinctly different needs, the health care evaluation seminars providing introductory courses to the field and the annual forums providing the field with the necessary opportunity to develop itself appropriately.

VI EXAMPLES OF APPLICATIONS FOR HEALTH PROGRAM
EVALUATION: CONCEPTUAL AND OTHER PROBLEM AREAS

1. Summary

This section outlines some of the reasons why evaluation efforts have not been useful for decision making. The objectives pursued by many health programs are so broadly stated that it becomes impossible to understand their justification. Too often, the evaluation sequence of program preparation is neglected, both in terms of conceptualization and of operationalization. For this essential component of the administrative cycle, conventional wisdom is a poor substitute. In addition to the cardinal error of failing to specify in observable and measurable terms the explicit objectives set for a given program, this section illustrates five other common failures, with brief examples.

The first is the failure to state what is expected to occur if the program is not implemented. The effort of specification forces one to state explicitly what is otherwise assumed implicitly. The validity of these assumptions can only be assessed in the open. (See the influenza vaccine program and home care program examples.)

The second is the failure to specify the complete range of activities and inventory of resources involved in the realization of the program, (as in the transplant perfusion program and Influenza vaccination program examples.)

The third is the failure to adopt a consistent standpoint for costing the resources used in programs. (See asbestos miners example.)

The fourth is a composite mix of errors made by aggregating benefits over time and participating in the universal reluctance to discount them to their present value. Any program, such as Home Care or Day Surgery, which requires changes in the capital

stock (e.g., fewer inpatient beds) has smaller initial benefits which grow over time. However, future benefits are less valuable than present ones. In other cases where benefits are recovered over longer time frames, (e.g., shared administration programs), even more complex formulae are necessary.

The last failure is related to the costing out of capital at a single point in time (expensing) rather than over time (depreciation and implicit interest cost). Even worse is to ignore capital cost entirely because it is in some other budget.

2. Introduction

The process and purposes of evaluation can be defined, diffused, and ramified without limit, but the essential idea is nevertheless very simple. Evaluation requires the assignment of values, and value is a relative concept, in two major senses.

First, all values are defined relative to an explicit or implicit evaluator. There must be some individual or collective group, either real or hypothesized, with objectives such that activities or objects take on values relative to those objectives. Change the identity or objectives of that evaluator and the values change too. Second, all valuation is relative in that it presupposes (often implicitly) a choice between two or more options, courses of action, or states-of-the-world. Each is valued relative to the other. There is no objective definition of value, as a quality inherent in an object or a policy, which can be established by a process of "scientific" evaluation. Some of the rational and analytic processes involved in evaluative work may be similar to those used in scientific research; but scientific evaluation as such is a contradiction in terms.

These principles may be illustrated by an example from the real estate market. We often speak of a particular house as worth so many dollars at a certain point in time; this appears to be an objective statement of fact (which of course may be more

or less accurate) unrelated either to a specific evaluator or a specific alternative state-of-the-world. But in fact a professional appraiser, in making such an evaluation, is attempting to estimate what some buyer will pay for it. He may not know who that buyer will be, so the estimate must be based on what (presumably) similar buyers have paid for similar houses. When the house is sold, its value (or at least a lower bound estimate of its value) becomes known and supersedes the appraiser's estimate. The appraiser may judge that the house sold for more than it is worth, which means that he believes no other buyer would have paid as much. But unless he has reason to believe the buyer was misinformed about the house (or about other alternatives) this statement is irrelevant. The house is worth what the (informed) buyer will pay, to that buyer. Apparently objective market evaluations thus represent values defined relative to the preferences of an ill-specified group of market participants, whose subjective preferences have been aggregated in a specific way.

This specification of standpoint becomes particularly critical in health care programs, where one can evaluate from the point of view of an institution, or a sub-department, or a government, or the society as a whole. Outside evaluators tend to take the system - wide or societal viewpoint, implicitly treating the whole society as the buyers of program output. Thus a (potentially) cost-reducing home care program will be evaluated relative to inpatient facilities from the point of view of patients who will be served by the facilities and of taxpayers who will support them. The value of the program from the point of view of a local hospital, some of whose inpatient facilities will be (or should be - they usually are not) closed when the new service becomes available, will of course be very different, just as the seller of the house looks at the purchase price very differently from the buyer. One man's cost is another man's benefit, thus they will tend to produce different answers to cost-benefit comparisons. The peculiar feature of health care delivery is that

although evaluators tend to start from a societal viewpoint, operational control of programs by providers tends to respond to values as seen by providers. Hence the common discrepancies between what is done and what evaluators judge should be done. It is as if sellers of houses were able to require buyers to purchase houses and to pay prices determined by sellers' ("expert") evaluations - one would not be surprised to see higher prices as a result.

The second form of relativity arises because a house, like a program, is not valued in isolation. The statement that it is worth \$x, means that the appraiser believes that some representative buyer, or some buyer who will arrive in the next month (or three months, or) would compare two states-of-the-world, one in which he has \$x in the bank and one in which he owns the house but no money, and finds the second state preferable or at least equal to the first. Alternatively the states may be ownership of house encumbered by \$x mortgage against no house, no mortgage, or some intermediate state. Whatever the specification of these alternatives, some such choice must be possible. It is easy to see that one who receives the house as a gift or inheritance will value this state-of-the-world differently from one who has simultaneously acquired a large, high interest mortgage. To evaluate the acquisition of the house from the point of view of the new owner it is critical to know what else is going on.

This principle generalizes to health care program evaluation. Major institutional changes, actual or projected, induce extensive system responses and have extensive indirect as well as direct effects. One cannot evaluate their impact without identifying these responses, and without specifying, either explicitly or implicitly, what else is going on. In general, the statement should be explicit to protect against the likelihood that some of the implicitly assumed responses will turn out to be implausible. Thus, in evaluating a new project or program, it is very important to try to be as complete and as concrete as possible in describing

the effect upon the relevant variables in the world with and without the program. It is thus possible to compare and evaluate their complete alternative states.

It follows that evaluation has an inevitable hypothetical or "theoretical" component. Even if one evaluates an existing program, such evaluation must always be relative to some hypothetical world where the program did not exist. One may fail to specify the alternative explicitly and/or may specify it badly, but in the evaluative process an alternative (one at least) is always there by definition.

Beyond these fundamental principles, there is much that one can say about evaluation. In particular, the complete and accurate evaluation of (or placing of appropriate relative values upon) the various components of the state-of-the-world alternatives is by no means an obvious process. However, it may be instructive to consider real-life examples of the sort of programs which tend to be evaluated and to show how certain types of basic errors can be made in the evaluation process. As a result very large biases can be built into the results (sometimes deliberately). The point of these examples, which are cut-down versions of real life, is to illustrate certain problems and flag certain pitfalls. They should not be considered "how to" guides for doing the evaluations of the specific types of programs mentioned.

3. Home Care Programs

One of the selling points which has been used to justify the introduction and extension of home care (HC) programs is the capacity of such programs to lower the rate of acute care hospital bed use and, thereby, moderate the high cost of hospital care. The same arguments are, of course, made for chronic and convalescent hospitalization, nursing homes, and alternative forms of institutionalization. The crudest form of "evaluation" supporting this claim provides a good example of inadequate or inaccurate specification of the net effects of the program, or

the state-of-the-world with and without home care.¹ This is the popular technique of counting the number of person-days of care provided to home care enrollees, multiplying this number by the average per diem cost of hospital care in the local area, and using the result as an estimate of the total hospital costs "saved" by the program.

For example, a home care program which had provided 2000 person-days of care in 1975 might operate in a region or be based in a hospital where the per diem cost of hospital care was \$80. If program costs were \$15 per person-day in home care, an enthusiastic program administrator might declare "savings" of $\$80 \times 2000 = \$160,000$, less $\$15 \times 2000 = \$30,000$ or \$130,000 per year. Such "savings" would appear to constitute a strong argument for expanding the home care program.

Such an argument embodies strong and somewhat implausible assumptions about what would have happened in the absence of the program. It is assumed that all those persons in the HC Program would otherwise have been hospitalized, and for exactly the same number of days. Following this reasoning, the total inpatient-day count in the local hospital would have been 2000 higher in the absence of the HC Program. Furthermore, acute care hospital costs would have been proportionately higher. If the local area in 1975 actually had a patient-day count of 20,000 (which on a per diem of \$80 implies a hospital budget of $\$80 \times 20,000 = \$1,600,000$), then it is assumed that in-patient utilization would have been 10% higher and costs would also have been 10% higher.

These assumptions are implausible for a number of reasons. First, with respect to utilization, it is frequently observed that patients discharged from hospital to home care will spend longer in total under care than if the HC Program had not existed. The acute episode may be shorter, but the acute plus home episode is longer.

Second, patients may well be admitted to HC from the community without an acute care episode. It is possible, but by no means certain, that such cases represent avoided admissions which would in the absence of HC have become inpatients. Moreover, if the HC program restricts itself to admitting only patients discharged from acute care, it may find itself actually generating hospital use due to a tendency for patients to be admitted for a short time in order to qualify for HC. Thus the actual number of acute care days avoided by the HC program will, in general, be less than the number provided in the HC Program by an amount which will be difficult to determine but may be very significant.²

Therefore, the implicit assumption that each HC day offsets one acute day is inaccurate and overstates savings, but the problem does not end there. If acute care days are avoided, they will not, in general, be "full-cost" days. This arises for several reasons. First, the full cost per diem includes a variety of costs incurred in the hospital for services other than inpatient care. Teaching hospitals are the most obvious example: if a significant part of a hospital's costs are incurred for medical education these costs will not correspond proportionately to the inpatient case load. The same is clearly true of the diagnostic departments and clinics which function partly for outpatients. Moreover, the hospital's total costs include a large fixed cost component, independent of care load, which is determined by the scale of the establishment. Finally, the types of cases admitted to home care will be cases of minimal service intensity, either because the case is in the late acute stage when discharged or because extensive (and expensive) diagnostic or therapeutic intervention is not required. Therefore, the actual change in costs associated with transferring patients between home and acute care are likely to be "hotel" costs (room, board, laundry, etc.), which will be much lower than the per diem of the hospital as a whole. But even these are only partly avoided. Some are merely transferred.

The "hotel" costs include food, but the HC patient also eats. The difference is that in acute care, the hospital budget meets these costs - in HC they are absorbed in the patient's budget. Food costs are "saved" from the point of view of the reimbursing agency, but not from a social point of view.

Hence, we may reformulate our example. Suppose the hospital with a per diem of \$80 actually has "hotel" costs of \$20, so that shortening the length of stay of a recuperating surgical patient only saves \$20. Assuming that \$5 of this is food costs and that 1000 of the HC person-days are avoided acute-care hospital days (the rest are additional days of care), then hospital costs saved are $1000 \times \$20 = \$20,000$. However, of this amount, \$5000 represents costs not saved by society, only transferred from the hospital to the patient. The total cost of the HC Program is still $\$15 \times 2000 = \$30,000$, but a "saving" of \$16,000 has become a net cost of $\$30,000 - \$15,000 = \$15,000$, plus a transfer of \$5000 from hospital to patient budgets.

Of course the HC Program may still be worth while -- the extra 1000 HC days at \$15 each may be considered a social benefit worth the price. But if the HC Program is an insured benefit, one cannot be sure. This follows because the individual patient and/or physician will seek entry to HC (or more important, resist discharge) so long as the perceived benefit is positive. If any benefit is believed to follow from HC, if it is "free", one continues it. But it is not "free" - it costs \$15 per day. Therefore, there is a possibility of overuse which suggests that, in general, the extra days of care may not all be "worth-while".

And there is a final complication. Under current reimbursement modes for physicians and hospitals, there are strong economic incentives not to leave beds empty. Thus, the 1000 days of acute care actually avoided by the HC Program may, by releasing beds, raise the admission rate for other and

unrelated conditions. This will not occur if the HC Program is introduced in a growing community as an alternative to building more beds, or if it is introduced at the same time as withdrawal of facilities in a static community. But if the inpatient bed stock is not adjusted to reflect the new program, there is a strong possibility that other admissions may rise. If "hotel type" patient days are avoided but complete new admissions are accommodated, hospital costs will actually rise in addition to the HC costs.

In general, a proper evaluation of the HC program must involve a calculation of total expected hospital utilization in the relevant region, including cases of HC type and others, with and without the HC program. This will have to be much more sophisticated than simply assuming a one-to-one relationship of acute to home care days, and should include information on a diagnosis specific basis, as well as population and physician trends. If the program being evaluated is operating, the "no program" utilization estimate will be hypothesized, but could be based on trend data on inpatient admissions by diagnosis, region, and physician. If a proposed new HC Program is being evaluated, projection of both cases will have to depend on examination of trends, and it will not be possible to look for changes in trends on or shortly after program introduction.

Given two alternatives, with well-specified and justified utilization patterns for inpatient care, with and without HC, one must then reconstruct hypothetical budgets for the hospital(s) in the relevant region. These will reflect old and new utilization patterns, and ideally should be sensitive to differences in diagnostic mix of inpatient load between the HC/no HC situation, as well as to differences in admission rate and length of stay. In constructing such hypothetical budgets account should be taken of the fact that many departmental expenditures in hospitals do not adjust proportionately to patient load. (As an extreme example, the HC Program itself might be

part of the hospital. In this case, care will have to be taken that HC costs include any services provided by the hospital, at a fair cost, and that such costs are excluded from the hospital budget.)

Finally, one should compile an estimate of total hospital plus HC costs to compare with hospital costs if there were no HC. This will show the net cost of the HC Program (which would be negative if the HC Program really does have a significant impact on hospital use). This must be adjusted for changes in cost which are merely transferred from health care systems to patient or vice versa. Against this net cost may be set the change in health care provided, the evaluation of which will depend on the comparability of acute and home days. Three classes of persons may be identified:

- (1) those who are in home care who would not otherwise have been cared for,
- (2) those who are in home care who would otherwise have been in acute care,
- (3) those who are in acute care as a result of the freeing up of inpatient beds by the HC Program and who would otherwise have been treated on an ambulatory basis.

The health benefits for group (2) are positive, for (1) and (3) the net benefit is less clear. But it is the benefit to these groups which must be set against the net costs of the HC Program.

Depending on the response of the acute care sector, these total net costs may be negative ("saved" hospital costs greater than direct HC Program costs) or positive (particularly as utilization shifts toward more admissions and shorter stays) or somewhere in between. There is no way to tell in advance what the effect of the program will be. Moreover, the reconstruction of the hypothetical pattern of inpatient use and the corresponding budget for inpatient services is unavoidably uncertain and dependent on estimation and inspired

guesswork. What must be recognized and accepted is that such a process cannot be avoided -- a single and crude "evaluative" process such as initially described (per diem X HC person days) embodies such a hypothetical reconstruction implicitly (one-to-one offset of HC and acute days, proportional adjustment of hospital budget). Once made explicit, such a simple reconstruction is seen to be inadequate, biased, and rather silly. But a more sophisticated reconstruction can be rather difficult.

4. Illustrations from an Organ Perfusion Program

In general, the evaluative components associated with research project proposals, particularly in applications submitted for National Health and Welfare Research Grants, are either ill-defined or non-existent. It is commonly very difficult to criticize such proposals because of the impossibility of establishing the type of evaluation and how it is to be carried out. One particular proposal, however, from a hospital which proposed to establish and evaluate an organ perfusion and preservation program (an elaborate and highly sophisticated technique to preserve living tissues pending transplant), was sufficiently detailed to provide a clear picture of the procedures intended, thereby serving as a useful illustration of common flaws in evaluative efforts. It should be emphasized that these flaws arise, to a large extent, from the nature of present hospital budgeting, management, and reimbursement practices. No criticism of the hospital management involved is intended.

Incomplete Cost Statements

Expected total costs of the organ perfusion and preservation program were reported as salaries, remuneration and fringe benefits, drugs and supplies, and depreciation on major equipment. This breakdown obviously conformed to normal hospital accounting practice of not assigning overhead expenses to programs. Taken literally, however, it implied that the program would be carried out on

the hospital front lawn. No allowance was made for the cost of space or administrative overhead, either on a current basis or as an allocation of capital costs.

Of course, it is probably true that for any one program no new building will be built or administrative staff hired. But the total expansion of hospital activities by such new programs will eventually lead to additional current expenses for administration and space. On average, such costs seem to add 30% - 50% to operating costs of programs. They include:

- a) Current costs of administration.
- b) Current costs of space maintenance (heat, light, water, cleaning, security).
- c) Capital costs of buildings and equipment - both depreciation and pure interest cost.

In this context, it should be noted that capital costs, both buildings and machinery, should include interest as well as depreciation. Certainly capital wears out over a period of years, and the amount of wear in any year attributable to a program is a cost of that program. But the capital used also has an opportunity cost in addition to the wear factor - resources used to provide any piece of capital are then unavailable for other purposes. This cost is reflected in the market interest rate, which indicates the value of program capital put to some other use. In the case of the organ perfusion program, this factor is unlikely to be large, but it should not be left out.

The separation of capital and operating budgets in hospitals discourages such accounting - capital costs are not charged to the hospital. But the true cost to the province and its taxpayers of such a program certainly includes the foregone return that could have been earned on the capital used in that program, even if the best alternative use were to pay off a small part of the provincial debt and to let the capital flow back to the private sector.

It would be desirable if the existing budget framework could distinguish between budgetary and non-budgetary costs. At present, hospital budgets are incomplete cost statements, but costs are no less real for not being recorded.

No Clear Specification of Alternative "States of the World"

The proposal provided information on the mechanics of perfusion, together with a machine sketch. It did not, however, provide a description of what the program was expected to do as opposed to what perfusion will do. What was lacking was a clear outline of the expected pattern of work in a specific or hypothetical future year with and without the perfusion service. Evaluation is inherently comparative - we must compare (necessarily hypothetical) future "worlds", one including the service, the other without it.

How many transplants would take place in each? The proposal indicated 15 without, 30 with, and that an estimated 30 perfusions would take place. This suggested that all transplanted kidneys would be perfused. The program appeared both to expand service and to upgrade existing services.

What would have happened to the 15 transplant patients in the absence of the program? Dialysis? Death? What is the long-run prognosis for the untreated patient, the dialysed patient, the transplant patient with and without a perfused organ? Estimates will be subjective and uncertain, and the evaluator will need the technical specialist's "best guess" in these matters. In general, one should start with a kidney patient arising spontaneously in the population and should trace him through the alternative treatment paths through the expected range of outcomes. The role of perfusion in altering these outcomes can then be described.

Incomplete Specification of Program Evaluated

Perfusion/preservation is only a part of the total pattern of treatment for kidney diseases, but this whole pattern is expected to be influenced by the availability of perfusion. If perfusion changes treatment patterns, we would be considering only a small portion of the real program. This real program would be: introduction of perfusion resulting in an increase in surgical activity, more transplants, perhaps less dialysis but perhaps more if all capacity continued to be fully used, and either more or less hospital care depending on whether the increase in transplant cases outweighed reduced patient stay due to better organs. The perfusion program would merely be the "tip of the iceberg" and its evaluation would only make sense in the larger context of the additional activities arising from its introduction. However, unless the changes in associated activities (which also have significant costs and benefits) are clearly specified, one can only "evaluate" a partial or sub-program by evaluating perfusion.

These omissions, perhaps, arise out of the traditional division of responsibility in hospitals: treatment and output generally being the responsibility of the medical staff. It appears that the administrator is merely informed by the medical staff that a program "need" exists - he is not expected to enquire too closely into the grounds for this opinion. In such a climate, evaluation is not possible.

Subjunctive Rather than Probabilistic Quantitative Benefit Statements

A number of assertions were made about benefits which "might", "could" or "should" follow from the program. No estimates were given as to their scale or probability of occurrence. Hospitalization of transplant cases could be reduced, but the amount, probability and total potential days involved were not stated. Transplant rejections could be reduced, but the size of reduction, years of life saved, and quality of that life were not specified.

A program can be justified either in terms of cost reduction in other programs, or of improvement in mortality/morbidity outcomes, but these justifications must be quantitative. Many good things might result from any new program, but they also might not. Health personnel, as a result of clinical training tend to think in anecdotal rather than statistical terms and to overemphasize the improbable. But one cannot perform program evaluation without probabilistic, quantitative assessment of program outcomes. This is completely absent from many proposals. Moreover, it must be remembered that such assessment must be comparative; it must analyze the differential impact of the program by examining hypothetical program/no program states of the world and specifying all other changes which would have to take place in response to the introduction of a program. None of these were described in the application being discussed, let alone quantified.

An adequate evaluation is not possible, even if cost data is complete, if no quantitative estimates of expected benefit are made. These need not be one-point estimates or convertible into dollars but they must be quantified if the program is to be evaluated. Lying behind this, of course, are the conceptual problems of drawing an appropriate boundary around the program itself and of specifying expected "states-of-the-world" with and without the program.

5. Prevention or Palliation of Environmental Damage-Asbestos

Recent concern over chronic lung disease in asbestos workers represents awareness of the outcome of a program for dealing with worker health hazards, which is a conceptual parallel to screening or other types of preventive activity. The health hazard associated with asbestos has been known for a number of years. From the point of view of the asbestos company, one might deal with this risk either by investing in equipment to protect workers against health damage or by paying workers more to induce them to undertake the risk. Either way, the

health hazard will be reflected in higher costs of production and, therefore, either higher asbestos prices or lower profits (or both). This is as it should be. The health hazard is a real cost of production to society and should be reflected in the price society pays for its asbestos.³

The choice of program will then be made by the company on the basis of relative costs. If the technology for lowering the risk is very expensive and if the risk itself is relatively small or the associated morbidity minimal, it may well be cheaper to pay workers extra to incur the risk.

If workers are fully informed as to risk, this may be socially optimal -- dollars are balanced against risks all through society, most obviously in the transportation field. As individuals, each of us regularly incur certain risks to life and limb because we judge the costs of avoidance not worth it. As a society, we make the same judgements in, for example, highway spending. On the other hand, if the technology for risk reduction is cheap and the probability of morbidity or its severity are high, compensation may be more costly than prevention.

We may evaluate alternative programs for dealing with risk, as in the asbestos case, by investing in its reduction or compensating people for living with it, according to which is most costly, (always making the very powerful assumption that those who are compensated for bearing the risk are aware of its magnitude). The parallel between investing in risk-reduction through preventive measures such as mass screening, periodic check-ups or immunization, and the alternative strategy of dealing with morbidity as it arises, is close.

This evaluation by the market or by comparison of compensation costs against prevention costs will break down when an outside group incurs some of the costs. From the points of view of the company and the workers, the evaluation is complete. Workers balance the extra pay against extra risk and accept or reject the risk. The company balances compensation against the cost of clean-up.

But from a social point of view, there may be hospital, medical, and other social maintenance costs arising from worker illness which are borne by the whole society through health and welfare programs. In this case, the balance struck between prevention and compensation by workers and company will underestimate the cost of the risk of illness because part of the cost is externalized -- incurred by neither -- and as a result, this balance will be biased. If, on the other hand, the governmental health insurance agency refuses to pay any benefits for illnesses generated by hazardous industrial environments, then the cost to the company of maintaining such environments rises. Workers have to be paid more either to provide health insurance coverage against the illness risk or to compensate them for the risk of health care costs as well as the risk of illness per se. The evaluation of prevention versus compensation thus shifts to make prevention relatively cheaper.

The general principle here is that evaluation of alternative strategies for dealing with a health hazard will depend on the perspective of the evaluator. In this case, the social perspective differs from that of worker/company, and evaluation made from the latter perspective may appear biased from the former perspective. What is critical is that a complete specification of the impacts of the different approaches be made -- the compensation approach involves some costs to the wider community which may be avoided by prevention.⁴ What may be difficult is to find ways of ensuring that private decision-makers (workers or company) take account of such costs in their internal evaluation.

This difficulty is the more severe, of course, in that the company has an obvious incentive to understate the magnitude of health hazards. This will either reduce the additional wages which workers would be paid to compensate them for accepting such risks, or dilute political pressures on the company to incur higher costs for maintaining safer environments. With their knowledge of the process of production, the company is in a superior strategic

position. As a result, collection of information about and policing of hazardous environments may devolve upon governmental organizations and may require significant additional resources. Again it should be stressed, however, that underestimation of health hazards does not lower the true social costs of a given production process. Apparent costs are lowered by transferring part of the total to workers, and/or to the broader society through the health care system. Beneficiaries of this transfer will be the owners of the company and/or the purchasers of the product.

6. Day Care Surgery Program (DCU)

Evaluation of a day care surgery program parallels fairly closely the discussion of home care in that it represents an alternative program intended to substitute for inpatient use. Particularly applicable to the care of children, it enables one to avoid an inpatient episode altogether. As in the crude estimate of "savings" from a home care program, one could estimate "savings" from a day care unit by enumerating its patient load, multiplying by the expected length of stay if all had been inpatients, and thus calculating total inpatient admissions and days avoided. Less clear, of course, is by what such a total should be multiplied. The problem is that a DCU located in a hospital makes use of a wide range of hospital facilities since for many purposes, the DCU patients can not be distinguished from inpatients (while actually undergoing surgery, for example). Moreover, the types of cases that can be treated in a DCU will tend to be relatively straightforward, not involving highly complex diagnosis or treatment, and they must be compared with similarly straightforward inpatient cases. It would obviously be incorrect to calculate the total inpatient days avoided, as above, multiply this by the hospital per diem, and compare the total with the direct, identified costs of running the DCU itself. This procedure would overcount the costs of the inpatient cases and undercount the day care costs because of the large volume of hospital services used by such cases.

As in the home care case, the first problem of a proper evaluation is to determine a hypothetical hospital utilization pattern with or without the DCU. Since DCU cases represent discrete episodes, the problem of length of patient stay does not arise. Home Care augments an inpatient episode, day care substitutes for it. However, it is critical to determine how many of the cases treated in a DCU would, in the absence of the DCU, have been treated as inpatients, as outpatients or not at all. Moreover, it is possible that a new unit will change admission patterns so that inpatient admissions actually rise due to physicians with multiple appointments shifting their admitting in response to the attraction of the DCU.

Therefore, one has to build up two alternative views of the world, with and without DCU admission, taking into account the patient load patterns of all hospitals in the local catchment area, not just the hospital with a new unit. All the caveats in the home care program discussion about the likely response of admitting behaviour to the availability of new facilities apply equally in this case.

Given these alternative utilization patterns, one must try to construct associated costs. But here one encounters the problem of time horizon (which was ignored in the discussion of home care). The costs associated with different utilization patterns will vary dramatically, depending upon whether one assumes that variation is small enough to be accommodated within a given physical capacity, or whether one hypothesizes an expansion (or contraction) of scale of operations so as to keep utilization rates constant. For example, if a DCU actually does lower inpatient use, does one calculate only the variable cost savings associated with this reduction? These will be relatively small since all treatment costs are the same regardless of whether the case is inpatient or DCU. Or does one calculate a share of fixed cost - buildings and equipment - as well?

Neither one of these dominates the other -- they answer different questions. The variable cost approach is an answer to the short-run question -- by how much might next year's inpatient budget actually be reduced if the inpatient load fell? The second addresses a more long-run policy question, if the hospital system adapts its capital stock (over time) to its new lower inpatient load, how much could be saved? Both are worth knowing, but the issue is somewhat obscured by the tendency of governments and non-profit institutions to do their capital accounting on a current basis.

Capital should be charged for as it is used, with a charge combining an implicit rate of interest on invested capital and as realistic a depreciation rate as possible. Instead, current practice tends to charge capital expenditures to the year of occurrence, which undercounts the costs of ongoing programs and overcounts the costs of starting new ones. A related tendency is to treat existing capital as "free", making no charge for space or space maintenance when evaluating a new program merely because no new building is built. This latter procedure is valid only if, in the absence of the proposed program, the space and facilities it would occupy would stand heated, lighted, cleaned, and vacant -- a zero opportunity cost.

The proper handling of capital costs is clearly important because any program which substitutes one institutional alternative for another is likely to affect capital requirements as well as operating costs. If more extensive use of DCU or home care facilities actually could reduce inpatient utilization (which, as stressed, is far from certain), then over a period of time the required stock of inpatient capital (relative to population) would fall, and the savings would be correspondingly greater. On the other hand, the payoff to new programs in terms of lowered capital needs may be deferred if the current capital stock is already built up to the requirements of the old technology. A deferred payoff is a reduced payoff.

The development of operating cost differentials associated with different inpatient utilization patterns (with or without DCU) is likely to be messy in practice, but fairly straightforward in principle.⁵ Difficulties arise over the allocation of joint costs, but these can usually be dealt with by conventional allocation which will not bias comparison between different modes of patient treatment in the same hospital. In general, one can partition direct and indirect operating costs into those incurred for DCU patients, those incurred for inpatients who are comparable to DCU patients, and those for services or patients unrelated to the DCU. The per patient costs in the former two categories can then be used to build up the alternative cost patterns in the with DCU/without DCU care. The result will be a cost comparison from the perspective of the regional hospital system, not just from the hospital with a DCU. This can then be compared with the net difference in volume and type of utilization under the two systems.

7. Shared Service Programs, Particularly Shared Administration Services

Most program administrators are aware of the main advantage of shared service programs -- economies of scale. Frequently, this is presumed sufficient to overcome many of the non-financial difficulties inherent in shared service arrangements, including loss of autonomy, the risk involved in inflexibly tying all consumers into one producer (e.g., risking hospital operations through a strike in a central laundry) and standardization requirements. In other instances, non-financial considerations may be a sufficient incentive to use shared services, particularly where higher quality can be obtained by a group of organizations which would be beyond the reach of any one of them. Examples would include shared industrial engineering or biomedical engineering programs, the interpretation of electrocardiograms by computers or by internists to

whom the tracings have been transmitted by telephone, improved laundry service when a central laundry replaces outdated facilities and shared data processing facilities.

For shared administration programs, individual hospital organizations may benefit by obtaining the services of one or more highly qualified administrators who would not otherwise be available to them. The problem then arises as to how to evaluate the services received. On the one hand, one may attempt to evaluate the savings involved over the costs of hiring equally or less qualified administrators at the individual institutions. Indices of administrative costs per patient day might be compared. However, these ignore the effects of administration on the rest of the hospital.

A second approach, to compare total costs of hospitals operated by shared administration programs, encounters difficulties arising from the lack of comparability between institutions and from the fact that many costs are beyond the control of the administrator. In any event, if either approach indicates cost savings, the question remains: to what end?

If the emphasis is on cost per unit, either administrative or total, perspective is based on the short-range future, whereas administrators are normally expected to have a longer perspective and to promote long-range planning for the institution. Conversely, if one looks to such indicators as number of complaints, staff turnover and frequency of untoward instances, costs are not directly reflected. But while these indicators reflect what may be considered organizational indicators of health, the perspective is again short-range, far shorter than normally expected of the administrator.

Other ratios often included are the percentage of institutional costs expended on administration, the infection rate, press notices, donations and volunteer statistics. In some cases, evaluation of administrators is objective-oriented, taking into

account the completion of specific projects, cost savings achievements, attainment of cost or productivity standards, maintenance of the hospital budget and utilization levels, and peer review.

Similarly, accreditation reports, organization audits and similar efforts to evaluate the organization may only focus on a limited range of administrative activity. For instance, they may focus on systems of administration, plans for immediate activities, standing policies and procedures, relevant by-laws and training programs, disaster plans, effective organizational arrangements and operations, and innovations.

If, on the other hand, the job of administrator is defined as the long-term maintenance of an organization which is healthy, able to respond dynamically to current and future demands and to effect change where appropriate, then, in fact, no short-term measure will adequately determine administrative effectiveness. By corollary, with such an arrangement (as with the hiring of an individual administrator), one must accept the risk involved in extending the evaluation over a considerable period of time. Only in this way will the true effectiveness of the administrative organization, individual or shared, be demonstrated.

With that perspective, it is possible to compare alternative forms of organization, which may include hiring individual (though less well-qualified) unit administrators, and supporting them through consultative arrangements from organizations such as hospital associations or consulting firms. The objectives of the shared service must be clearly stated in terms of effects, which will allow the comparison of alternative methods of service delivery. Furthermore, the time frame for evaluation must be appropriate, and this in itself will vary from service to service, in administrative as well as medical or professional matters. Economies of scale are not sufficient. The job itself must be done well.

8. Mass Vaccination Programs

In April 1976, the Minister of National Health and Welfare announced a mass vaccination program to protect Canadians against a possible pandemic of influenza. The program was to cover approximately ten million citizens and would have to be applied in a very short time period if it was to achieve any measure of success, i.e. preventing excessive deaths from pneumonia. The likelihood of such an epidemic arose from an epidemic of influenza, type A, which occurred in a garrison of the U.S. army, located at Fort Dix, N.J., in January 1976. A new strain of human influenza A virus was then isolated. Serologic studies demonstrated that this virus was related anti-genically to the virus that is believed to have caused the influenza pandemic of 1918-19 and to the strain that has been circulating in swine since then.

The Fort Dix episode represented the first documented human-to-human transmission of swine influenza virus since before 1930. "Influenza virus A/New Jersey/76, so-called swine influenza virus, represents a major change from the A/Hong Kong influenza viruses prevalent since 1968. (A current variant of these viruses, A/Victoria/75, was epidemic in many parts of the world, including most of Canada in 1975-76.) Experience indicates that when a major antigen change occurs in prevalent influenza A viruses, the new virus will rapidly spread world wide. This sequence of events was particularly notable in 1957 and 1968 when the Asian and Hong Kong strains first appeared."(6)

This program was to have mobilized a significant share of the national health resources for its implementation. Setting aside problems related to the relative effectiveness of currently available vaccines and to the uncertain probability of the pandemic threatening the Canadian population, the program involved the following elements:

1. The general objective was to prevent the occurrence of an epidemic of influenza in the Canadian population, in order to reduce morbidity and excess mortality from that cause. In his statement to the media, the Minister referred to the estimated 20 million death toll of the pandemic of 1918-19.
2. (1) Program activities would include the identification and registration of all "at risk" persons in the target population and (2) the administration of the vaccine.
3. The program output would be the proportion of the target population vaccinated against the disease within the time span set for the program.
4. The program outcome would be the decrease in morbidity and/or mortality which could reasonably be attributed to the immunization program itself rather than to other circumstances. In other words, it was expected that observed morbidity and/or mortality would be significantly less than that expected in the absence of the program.

As was implied earlier, the decision to organize this particular program occurred in a context of incomplete knowledge: the relative magnitude of the risk was unknown, and currently available vaccine, although of an efficacy proven to be about 70%, did not confer a long lasting protection. Hence, it was necessary to administer the vaccine as close as possible to the beginning of the high-risk period of the epidemic. It was this characteristic that created the difficulties in implementing the program for public health authorities. In spite of this, the decision to apply the program was deemed of greater value than a decision not to apply it. The validity of this decision was relative to the expected outcomes that had been identified as probable if the program had not been applied. In this example, mortality figures of 1918-19 were used by the media, most likely because of the antigenic similarity recognized earlier. Since

influenza epidemics occur periodically (17 have been documented in the U.S. since 1934)(7), one could question the choice of the 1918-19 pandemic for estimation purposes. Considering the changes that have affected so many socioeconomic variables since 1918, it would seem that mortality rates observed in the 1957 epidemic would have been a better estimating standard than those of the earlier period.

Since excess mortality in influenza epidemics affects mostly older age groups and patients with chronic illnesses, and since an estimated 88% of the population aged 57 and over is considered to be already immunized against swine influenza as a result of their contact with the wild virus between 1919 and 1927,(8) there is a strong probability that the loss of "benefits" that would have occurred, had the program not been approved, was over-estimated.

9. Perinatal Programs

Infant mortality is the health status index that is most sensitive to the impact of medical and hospital services. Perinatal mortality is the component of infant mortality that accounts for most of infant deaths: hence, the great popularity of perinatal programs.

1. The general objective of such programs is to reduce the perinatal mortality rate so that the infant mortality rate will, over a period of time, fall to that level which is deemed irreducible; that is, that level of mortality entirely explained by congenital abnormalities, etc.
2. The program activities cover a vast array of measures among which one may find one or several of the following:
 - 2.1 Pre- and post-natal classes made available to all or a proportion of expecting mothers.

- 2.2 Changes in the methods of surveillance of pregnancy.
- 2.3 Early referrals of at risk pregnancies from the general practitioner to specialists.
- 2.4 A disincentive device to reduce the use of general anesthesia during delivery.
- 2.5 Early resuscitation of the newborns.
- 2.6 Intensive care units for at risk and diseased newborns.

Program outputs in this example will be multiple and will vary with the activities intended to produce them. For instance, the proportion of expectant mothers who attend prenatal classes could be one variable. A better example would be the amount of change in the knowledge of those factors known to have an effect on the birth weight of the baby, such as cigarette smoking and diet. The amount of behavioral change, induced by this knowledge, would be an even more exact definition of the output of the first activity of the program.

Timing of the first prenatal visit, subsequent prenatal visits and the professional activities included in each visit are other outputs of the program. The same may be said about changes in the proportion of high risk pregnancies followed up by specialists or reductions in the rate of general anesthesia and of surgical procedures during delivery. Outputs of improved resuscitation routines might be defined as the reduction of the mean period of apnea after birth or the improvement of the mean APGAR score. The reduction of mortality rates, standardized for birth weights, might serve as a measure of the output of I.C.U. for neonates.

The outcomes of this type of complex program may have different facets, according to one's point of view. The first may be a significant reduction of perinatal mortality associated with the introduction of the program. The increase in survivorship may be due to a reduction in the mortality of children born so handicapped that under normal circumstances they would have died. Therefore, the gain may not have been obtained through a reduction of the avoidable mortality (or undesirable mortality), but through a reduction of mortality among the most crippled newborns. Assuming that the aim is maximization of survival in newborns without sequelae, evaluation of the program has to take this variable into account.

In this perinatal program it may well be that the most rewarding activities happen to be the least expensive and the easiest to implement. They may also be those most acceptable to the clients of the program. When one considers the natural history of early perinatal mortality, which accounts for the largest part of the total perinatal mortality, one may find that after those behavioral changes that have to occur early in pregnancy, such as reduced tobacco use or increased physical exercise, proper risk classification is the next most efficient activity, if it leads to adequate surveillance of the pregnancy. In this example, it is possible that the most costly parts of the program produce the least desirable effects.

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1. For an evaluation of a home care program which is not crude, see the study by M.L. Ingbar and S. Lee in S. Axelrod (ed.) The Economics of Health and Medical Care. Ann Arbor, Mich., 1964.
2. The discrepancy will, in general, be such that the home care days are greater, not less, than the acute days avoided. This may occur for a number of reasons including the time and trouble for both patients and physicians in gaining access to two types of programs and the economic incentives to physicians to keep moving patients through acute care beds, (an incentive which does not apply in the case of home care). The motivational patterns may become quite complex, but they all point in the same direction.
3. From the company's point of view, of course, the optimal situation is for the health hazard not to be known or to be underestimated. In this case, workers will be under-compensated and the company's cost of production lowered. From a social point of view, this does not make asbestos cheaper to produce -- it merely hides some of the cost and places it on workers.
4. Of course, if by forcing the company to compensate workers for health care costs as well, we encourage it to spend more on prevention, the result may be higher asbestos prices. (Although this may not necessarily apply -- asbestos mines may become worthless.) In this case, society trades lower health care costs for higher asbestos costs. But again, this is as it should be. Taxpayers who support health care programs should not subsidize asbestos users by enabling them to pay less than the full costs (including protection of worker health) of their products.
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APPENDIX I

Persons interviewed by members of the visiting team.

- A) Federal Government
- B) British Columbia
- C) Province of Quebec
- D) Saskatchewan

A) Federal Government

A. LeBlanc
Director
Operational Planning and Evaluation
Social Service Programs Branch
Department of National Health and Welfare

N.E. Gayowsky
Chief, Evaluation
Fitness and Amateur Sport
Department of National Health and Welfare

André Gagnon
Special Economic Advisor
Policy, Planning and Evaluation
Environment Canada

C.T. Osborne
Planning and Evaluation
Energy, Mines and Resources

B) British Columbia

Mr. J.W. Mainguy
Deputy Minister of Health

Dr. K.I.G. Benson
Associate Deputy Minister
Public Health Programmes

Dr. A. Larsen
Director of Epidemiology

Mr. D. Zink
Director
Division of Speech and Hearing

B) British Columbia (cont'd)

Dr. F. McCombie
Director
Division of Dental Health Services

Dr. A. Gray
Assistant Director
Division of Dental Health Services

Mr. W.D. Burrowes
Director of Vital Statistics

Miss Lavinia Crane
Director
Public Health Nursing

Mr. P. Breel
Senior Director
Hospital Programs

Mr. Alex Porteous
Associate Deputy Minister
Mental Health Programs

Mr. Paul Pallan
Development Group for Community
Human Resources and Health Centres

C) Province of Quebec

Ministère des Affaires sociales du Québec

M. Charles Chamard
Sous-ministre adjoint
Programmation

M. Gilles Desrochers
Sous-ministre adjoint
Financement

M. Marc Boucher
Directeur
Planification financière

M. Réjean Cantin
Directeur
Programmes de santé

C) Province of Quebec (cont'd)

Ministère des Affaires sociales du Québec

M. Henri-Paul Chaput
Directeur
Etablissements de services communautaires

M. Claude Guimont
Programmes de santé

M. Jacques Privé
Chef, Service des soins d'urgence

Mme Nicole Martin
Directeur
Planification des services sociaux

M. Claude Garcia
Directeur
Planification des services sociaux

Dr. Roland Leblanc
Directeur
Inspection des établissements de santé

M. Roger Ladouceur
Directeur
Conception des normes

D) Saskatchewan

Mr. N. Duane Adams
Assistant Deputy Minister
Department of Health

Dr. David Penman
Chairman
Medical Care Insurance Commission

Mr. C.P. Feader
Director Administrative Services
Administrative Services Branch

D) Saskatchewan (cont'd)

Mr. Steve Petz
Executive Director
Saskatchewan Prescription
Drug Plan

Mr. J. Sinclair
Assistant Executive Director
Saskatchewan Hospital Services Plan

Dr. J.D. Bury
Director
Health Promotion

APPENDIX II

WORKING PARTY ON PROGRAM EVALUATION

TERMS OF REFERENCE

To promote the evaluation of health programs, by:

- a. extending the range of evaluation activities,
- b. improving the technical quality of evaluation projects and procedures, through encouraging the cumulative development of knowledge and the sharing of technical expertise, and
- c. encouraging the use of evaluation results;

by providing:

1. A commentary on current practices in program evaluation, with recommendations and priorities as to how to improve them.
2. Recommendations regarding directions for research into methodologies of and subject areas for evaluation, directed to priorities for funding (e.g. National Health Grants).
3. Recommendations regarding how program evaluation results may be used, specific to existing and to new programs, and their use as planning inputs.
4. Identified data requirements, and recommendations as to how to improve data availability.
5. Information on those consultants or experts on program evaluation presently available.
6. Recommendations regarding the dissemination of information in the field, (e.g. news-letters, national clearing house, etc.)
7. Recommendations regarding the needed educational programs - full-time and continuing education.

APPENDIX III

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Health Program Evaluation

Part I

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